

## ABSTRACT OF THE DISCLOSURE

An autothermal reactor for the generation of a hydrogen-containing product gas stream from a feed gas stream comprises a reactor vessel having a feed gas stream inlet end and a product gas outlet end. A partial oxidation catalyst is located within the reactor vessel and positioned in the path of the feed gas stream. A steam methane reforming catalyst is located within the reactor vessel and positioned downstream from the partial oxidation catalyst in the path of the feed-gas stream. A first inlet is provided to introduce a first feed gas stream component selected from the feed gas component stream group comprising a hydrocarbon fuel, oxidant, and steam. The first inlet is located at the fuel gas stream inlet end of the reactor vessel. A mechanism to pulsate is associated with the first inlet to pulsate the flow of the first feed gas stream component into the autothermal reactor.

hbt1002-117.US04